July 26, 2017

U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety Administration**

East Building, PHH-30
1200 New Jersey Avenue S.E.
Washington, D.C. 20590

DOT-SP 20414
(FIRST REVISION)

EXPIRATION DATE: 2019-06-30

(FOR RENEWAL, SEE 49 CFR § 107.109)

1. GRANTEE: Lockheed Martin Corporation
Bethesda, MD

2. PURPOSE AND LIMITATION:

a. This special permit authorizes the transportation of xenon gas in non-DOT specification cylinders, lithium ion batteries contained in equipment and low production lithium ion batteries aboard cargo-only aircraft. This special permit provides no relief from the Hazardous Materials Regulations (HMR) other than as specifically stated herein. The most recent revision supersedes all previous revisions.

b. The safety analyses performed in the development of this special permit only considered the hazards and risks associated with the transportation in commerce.

c. No party status will be granted to this special permit.

d. This special permit serves as an approval under Special Provisions A88 and A99 of the ICAO TI and as a "Competent Authority Approval" as defined under 49 CFR § 107.1.

3. REGULATORY SYSTEM AFFECTED: 49 CFR Parts 106, 107 and 171-180.

4. REGULATIONS FROM WHICH EXEMPTED: 49 CFR §§ 172.101 Column (9B) in that the batteries may not exceed 35 kg and xenon gas may not exceed 150 kg; 173.185(a) in that the batteries

may not be of a type proven to have met the requirements of the UN Manual of Tests and Criteria; and 173.302(a) in that non-DOT specification cylinders are authorized.

5. BASIS: This special permit is based on the application of Lockheed Martin Corporation dated February 1, 2017 submitted in accordance with § 107.105 and the public proceeding thereon and additional information dated July 26, 2017.

6. HAZARDOUS MATERIALS (49 CFR 172.101):

Hazardous Materials Description			
Proper Shipping Name	**Hazard Class/ Division**	**Identi-fication Number**	**Packing Group**
Lithium ion batteries*	9	UN3480	N/A
Lithium ion batteries contained in equipment*	9	UN3481	N/A
Xenon, compressed	2.2 UN	UN2036	N/A

*Only low production (fewer than 100 batteries per year) lithium ion batteries and those contained in equipment may be offered for transportation under the terms of this approval.

7. SAFETY CONTROL MEASURES:

a. Lithium Ion Battery Safety Controls:

(1) Only batteries comprised of VL48E 48 Ah cells as described in the February 1, 2017 application and on file with the Office of Hazardous Materials Safety Approvals and Permits Division (OHMSAPD) are authorized to be transported under the terms of this approval.

(2) The approved battery is a 19,822 Wh lithium ion battery consisting of two modules of 9,946 maximum Wh each identified as A2100TR in the configurations submitted February 1, 2017 and on file with OHMSAPD.

(3) Modules and batteries must be equipped with an effective means of preventing dangerous reverse current flow.

(4) Batteries contained in equipment – Only two batteries per spacecraft are authorized. They must be packed and secured against movement to prevent accidental operation during transportation.

(5) Modules and batteries -

(i) Modules and batteries must be fitted with an effective means to protect against external short circuits.

(ii) Modules and batteries must be shipped at a State-of-Charge of not more than 30 percent during transportation.

b. Lithium Ion Battery Testing:

(1) All cells must be of a type that has successfully passed the testing requirements of CA2008080021.

(2) Modules and batteries must meet the "Test plan for Lithium-ion Battery using THE SAFT VL48E Cell" (PN20126180, Rev. D).

c. Lithium Ion Battery Packaging: Authorized batteries and equipment containing batteries must be prepared for transportation as follows:

(1) Batteries contained in equipment – The spacecraft containing the lithium ion batteries must be packed in strong outer packagings constructed of suitable material of adequate strength identified as the SPAR Shipping Container in the February 1, 2017 application and on file with OHMSAPD.

(2) Modules and batteries -

(i) Modules and batteries must have a strong, impact resistant outer casing;

(ii) Outer Packaging - Each module or battery must be packed inside a strong outer packaging or in protective enclosures (e.g., wood containers made in accordance with ASTM D6256 or plastic transport container identified as GPEM00000185, Rev F.) as described on February 1, 2017 and on file with OHMSAPD;

(iii) Modules and batteries must be secured to prevent inadvertent movement; and

(3) The terminals must be protected to prevent short circuits, and the module and battery must be so packaged that terminals could not be directly subjected to the weight of materials that may be superimposed during transportation.

(4) A package may contain not more than one spacecraft.

(5) The net weight of a battery including that contained in equipment may not exceed 192 kg.

(6) The net weight of a module in a package may not exceed 96 kg.

d. Xenon Tank Safety Controls: Packagings prescribed are non-DOT specification containers which are installed in spacecraft or components of spacecraft and over-packed in a designed transport container approved by competent authorities in country of origin. The Xenon tank design is on file with the Office of Hazardous Materials Safety Approvals and Permits Division.

(1) The package will contain 4 xenon tanks, containing a total of 2030 pounds of xenon. The xenon tank is constructed of a titanium metal liner overwrapped with layers of carbon. Each xenon tank has the following characteristics:

Tank Dimensions	42" long x 16.7" diameter
Tank Shell Material	Titanium
Tank Overwrap Material	Carbon Fiber
Maximum Expected Operating Pressure	2,700 psi (MEOP)
Proof Test Pressure	3,375 psi (1.25 x MEOP)

Burst Design Pressure	4,050 psi (1.50 x MEOP)
Actual Burst (Rupture) Test Pressure	6,115 psi (2.26 x MEOP)

This configuration also includes helium tanks and heat pipes which are packaged in accordance with special permit 11818.

e. MARKING: Each package or over pack if used must be marked with the special permit number, "DOT-SP 20414", in accordance with § 172.301(c).

8. SPECIAL PROVISIONS:

a. A current copy of this special permit must be maintained and made available for examination at each location where materials are packaged and offered for transportation under its authority.

b. A current copy of this special permit must accompany any shipment made under the terms of this special permit.

c. Any person who receives a package covered by this special permit may reoffer it for transportation provided no modification or change is made to the package and it is reoffered for transportation in conformance with this approval.

d. This special permit in no way affects the need to obtain any required authorizations from other agencies of the United States Government or from the competent authorities of countries of origin, transit and destination.

e. The special permit holder must maintain the following record and upon request make this record available to a DOT representative or an enforcement official. The record must contain a listing and number of shipments made to include:

(1) Dates of shipment; and

(2) Description of each type of shipment.

9. MODES OF TRANSPORTATION AUTHORIZED: Motor vehicle and cargo-only aircraft.

10. MODAL REQUIREMENTS: A current copy of this special permit must be carried aboard each aircraft or motor vehicle used to transport packages covered by this special permit. The shipper must furnish a copy of this special permit to the air carrier before or at the time the shipment is tendered.

11. COMPLIANCE: Failure by a person to comply with any of the following may result in suspension or revocation of this special permit and penalties prescribed by the Federal hazardous materials transportation law, 49 U.S.C. 5101 et seq:

    - All terms and conditions prescribed in this special permit and the Hazardous Materials Regulations, 49 CFR Parts 171-180.

    - Persons operating under the terms of this special permit must comply with the security plan requirement in Subpart I of Part 172 of the HMR, when applicable.

    - Registration required by § 107.601 et seq., when applicable.

    Each "Hazmat employee", as defined in § 171.8, who performs a function subject to this special permit must receive training on the requirements and conditions of this special permit in addition to the training required by §§ 172.700 through 172.704.

    No person may use or apply this special permit, including display of its number, when this special permit has expired or is otherwise no longer in effect.

    Under Title VII of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)— "The Hazardous Materials Safety and Security Reauthorization Act of 2005" (Pub. L. 109-59), 119 Stat. 1144 (August 10, 2005), amended the Federal hazardous materials transportation law by changing the term "exemption" to "special permit" and authorizes a special permit to be granted up to two years for new special permits and up to four years for renewals.

12. REPORTING REQUIREMENTS: Shipments or operations conducted under this special permit are subject to the Hazardous Materials Incident Reporting requirements specified in 49 CFR §§ 171.15 - Immediate notice of certain hazardous materials incidents, and 171.16 - Detailed hazardous

materials incident reports. In addition, the grantee(s) of this special permit must notify the Associate Administrator for Hazardous Materials Safety, in writing, of any incident involving a package, shipment or operation conducted under terms of this special permit.

Issued in Washington, D.C.:

for William Schoonover
Associate Administrator for Hazardous Materials Safety

Address all inquiries to: Associate Administrator for Hazardous Materials Safety, Pipeline and Hazardous Material Safety Administration, U.S. Department of Transportation, East Building PHH-30, 1200 New Jersey Avenue, Southeast, Washington, D.C. 20590.

Copies of this special permit may be obtained by accessing the Hazardous Materials Safety Homepage at http://hazmat.dot.gov/sp_app/special_permits/spec_perm_index.htm. Photo reproductions and legible reductions of this special permit are permitted. Any alteration of this special permit is prohibited.

PO: Andrew Eckenrode